Software Release 2024.01

Version Info

Branch: Master

Date: 25.06.24

Version: 2024.01

Navigation

Teach & Repeat

The Teach & Repeat cleaning mode introduces several new enhancements. It now includes obstacle avoidance, allowing the robot to deviate from its path when encountering obstacles. Additionally, red zones are now included in the Teach & Repeat process, striving to have more efficient navigation. Lastly, a new rescue feature for this mode has been included to enhance safety during the robot's cleaning operations.

- Path deviation is allowed, with a default value of up to 1 meter away from the original path. Users can also adjust the deviation distance by changing the configuration through the web-app (in advanced mode).
- The K900 considers red zones and obstacles when activating the Teach & Repeat mode.
- If the path is completely blocked, the K900 will wait for up to 1 minute for clearance to continue. Otherwise, if the path stays obstructed, the robot will abort its current course and return to the charging station.

Take in consideration:

- Accuracy between teach and repeat paths: +/-10 cm.
- Because of the robot's nature to try and avoid obstacles, it will not move close to the wall.

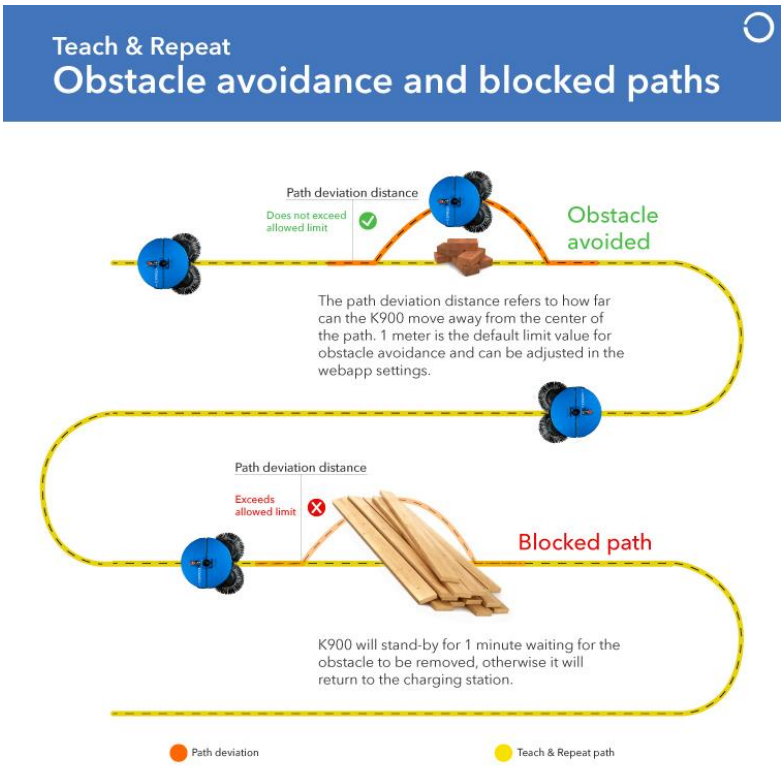


Figure 1: Image shows how the obstacle avoidance feature works in case of a new obstacle appearing after the Teach & Repeat path has been saved.

For more information check out the video on KEMARO Academy.

Wall-follow

For our Wall-follow mode, loop detection has been improved to be more intelligent and efficient. (write)

- Wall-follow is improved
- Loop detection -> the robot knows when the perimeter is completely cleaned.

WebApp

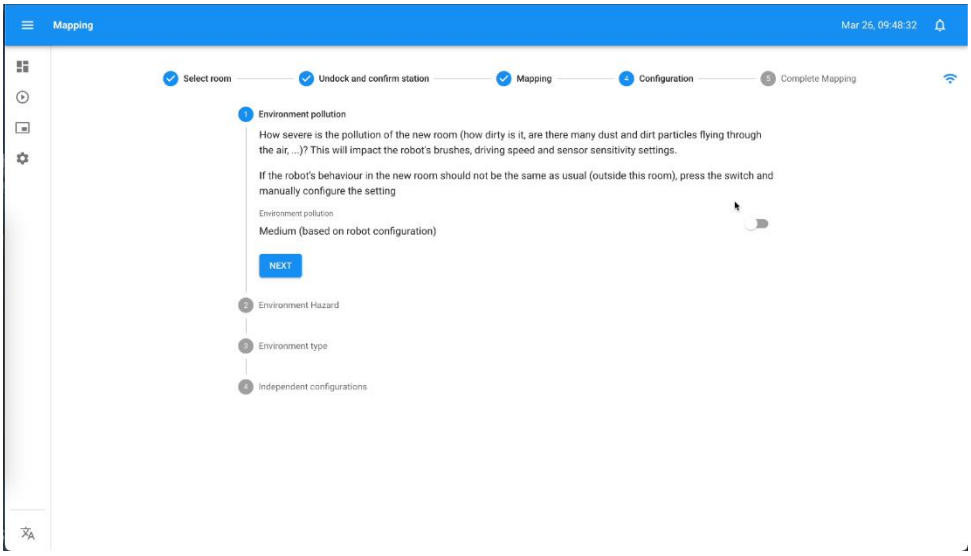
Mapping

Mapping new or existing rooms now includes environment configuration so to report details of existing or potential hazards.

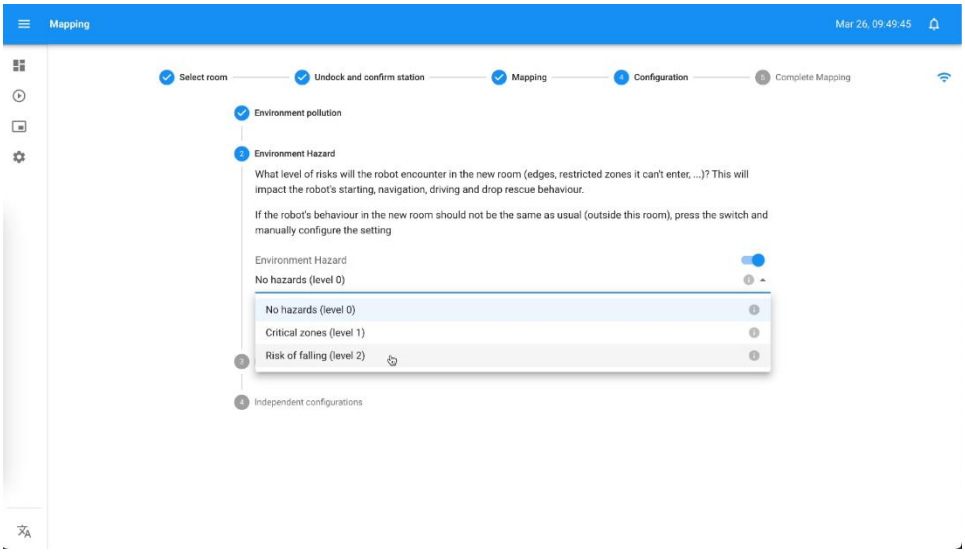
The environment configuration during mapping set-up consists of 4 stages:

- Environment pollution: Assessing the pollution level in the environment by adjusting brush speed, driving speed, sensor sensitivity, and vacuum power.
- Environment hazard: Identify any potential hazard present (hint: for more information about environment hazard settings and its behavior, please refer to SW Release note 2023.01).
- Environment type: Considering whether the room layout often changes.
- Independent configurations: Specific indications of requirements for this room.

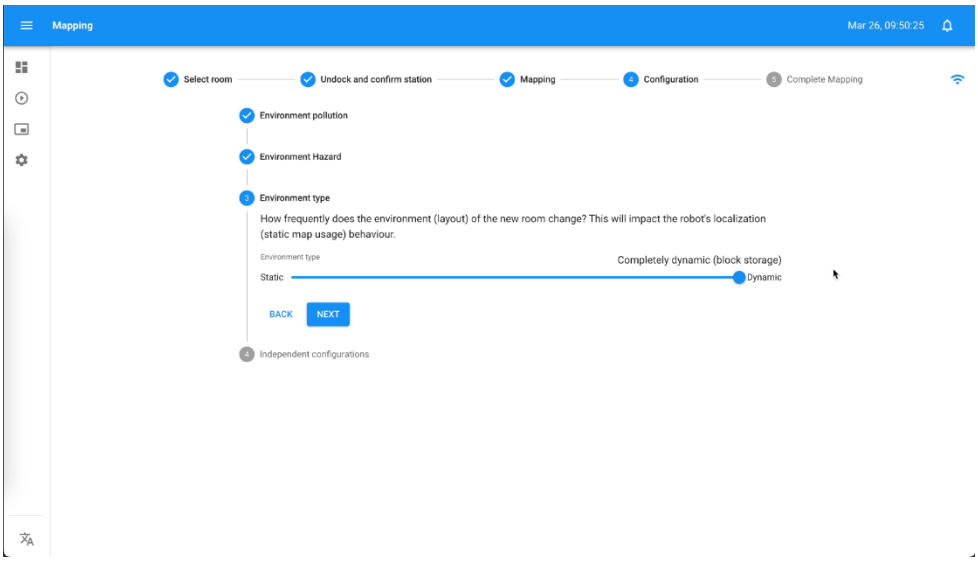
Environment pollution



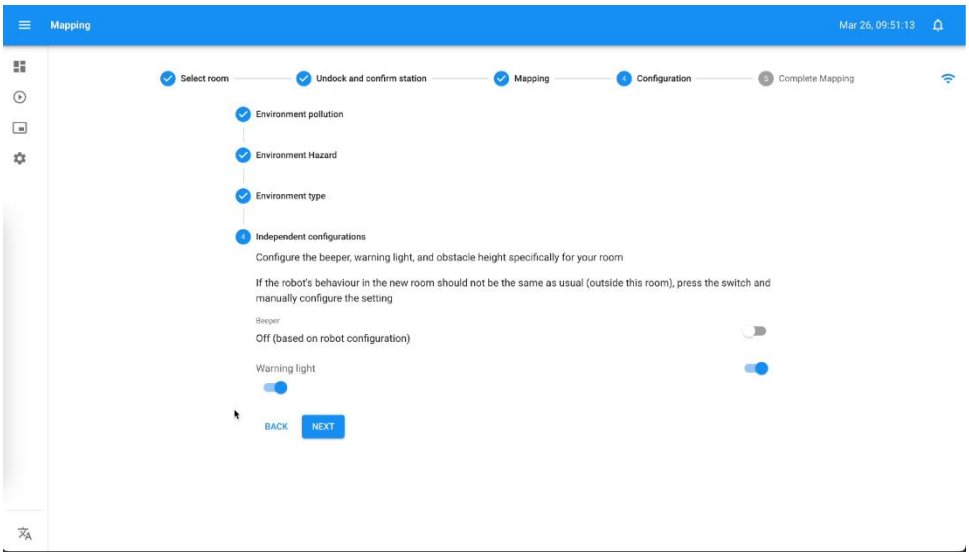
Environment hazard



Environment type



Independent configurations



Figures 2-5: Environment configuration during mapping set-up consists of 4 stages meant to assess, identify, and implement the necessary precautionary measures that the robot will need to perform successfully in said environment.

Configure Navigator Settings

The user can configure navigator settings like:

- Lane overlapping
- Wall distance
- Maximum allowed path deviation in Teach & Repeat

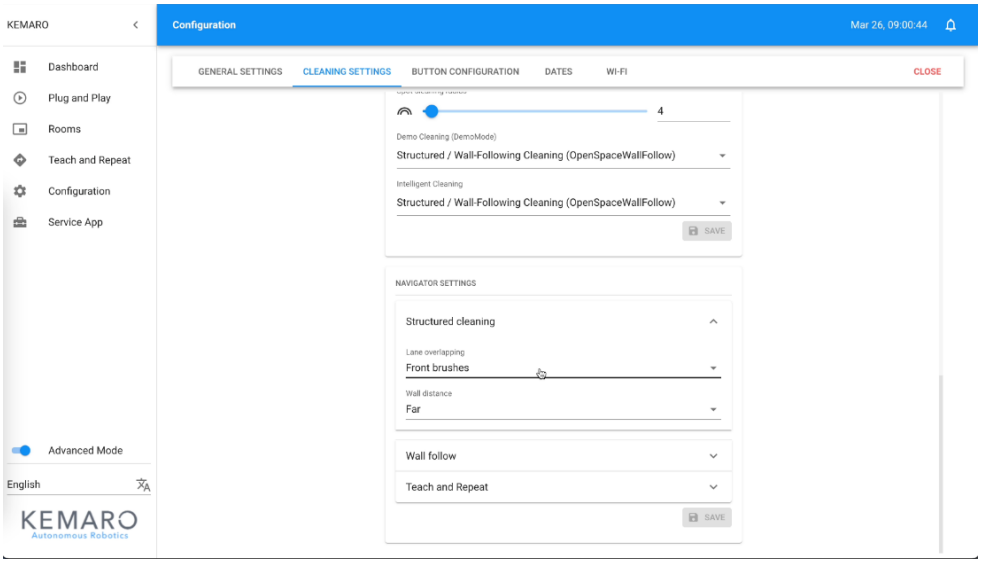


Figure 6: Configuration of navigator settings. In this example the user has adjusted the front brushes to clean with lane overlapping and has also chosen far wall distance for structured cleaning.

Available Wi-Fi networks

Wi-Fi configuration now has the possibility to display all the available networks and to add more than one network to your default options.

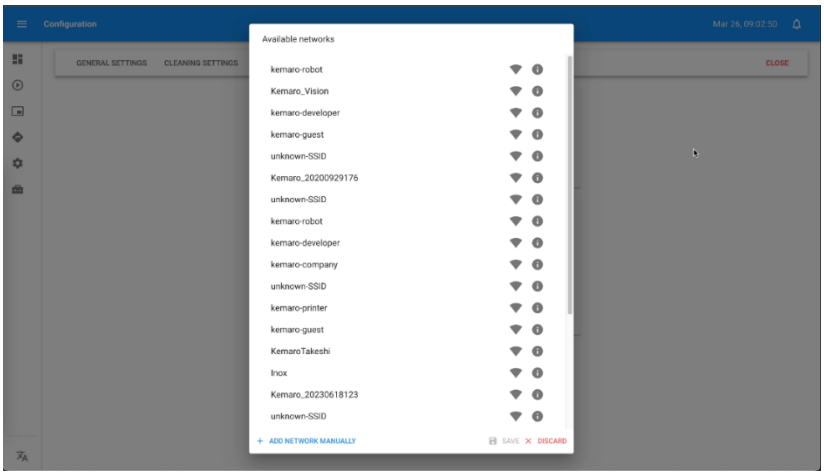


Figure 7: List of all the available wi-fi networks.

Event log – Starts and stops

Starts and stops are recorded in the event log and will be accompanied by a detailed reason.

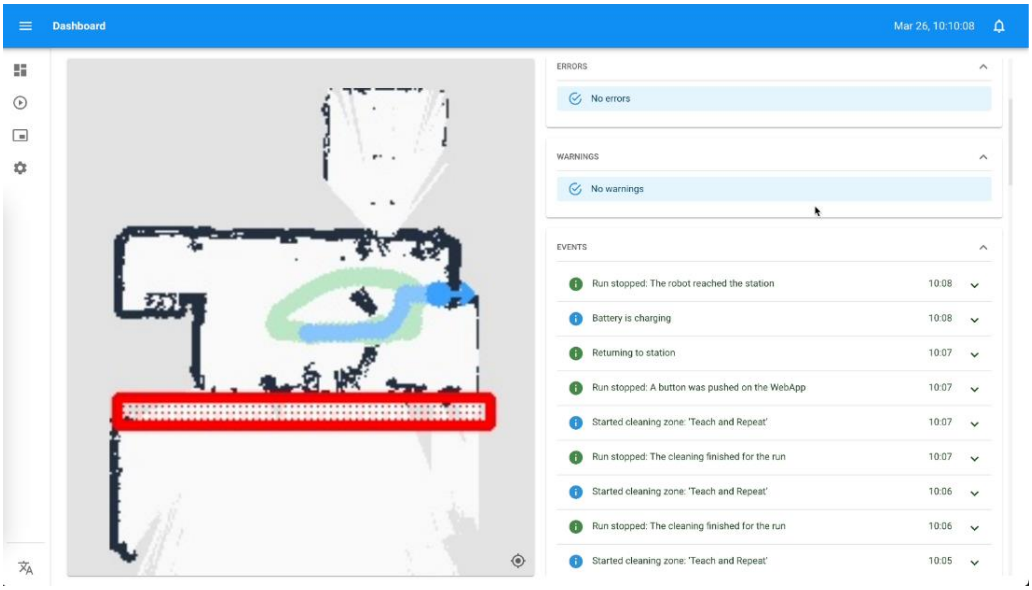


Figure 8: Reasons for stopping a run. In this case due to finishing the Teach & Repeat zone because of the manual button being pressed in the WebApp, then the robot successfully reached the charging station.

Event log – Past events

Past entries in the event log remain accessible, even after the robot has been shut down.

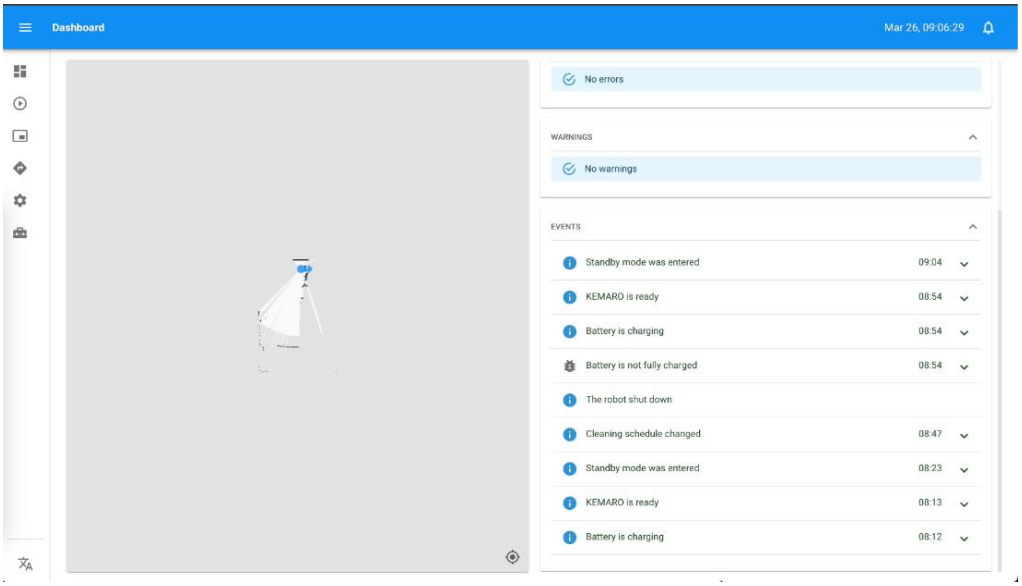


Figure 9: Events are shown even though the robot was shut down.

Granular cleaning configuration

Enhanced cleaning settings now allow you to customize the activation and deactivation of the beeper and warning light independently. The front lights cannot be adjusted anymore: They are always flashing during cleaning and off otherwise.

Settings can be done on all three levels (robot, room, and zone):

- Robot cleaning settings

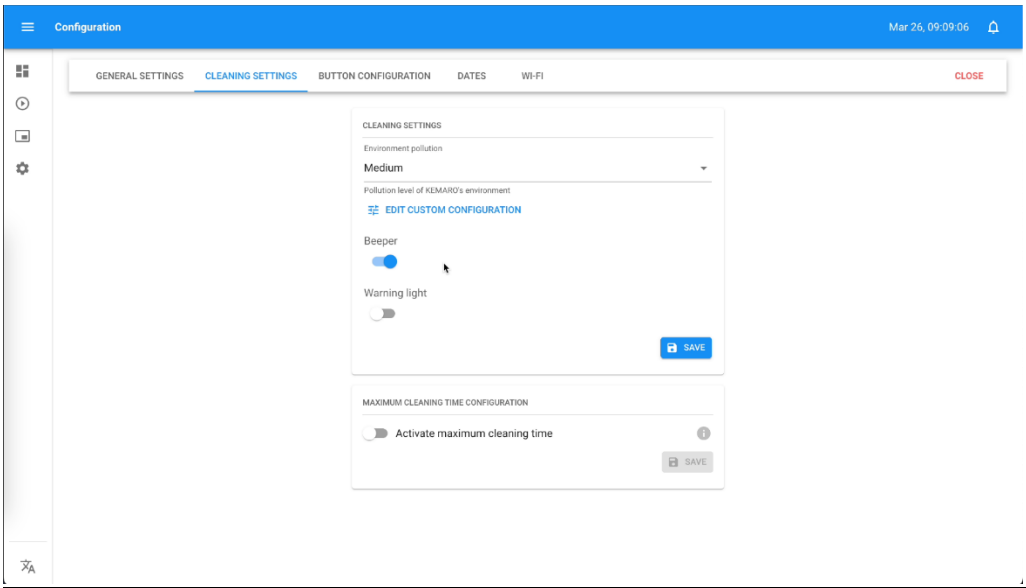


Figure 10: Adjusting cleaning configuration on robot level.

- Room cleaning configuration

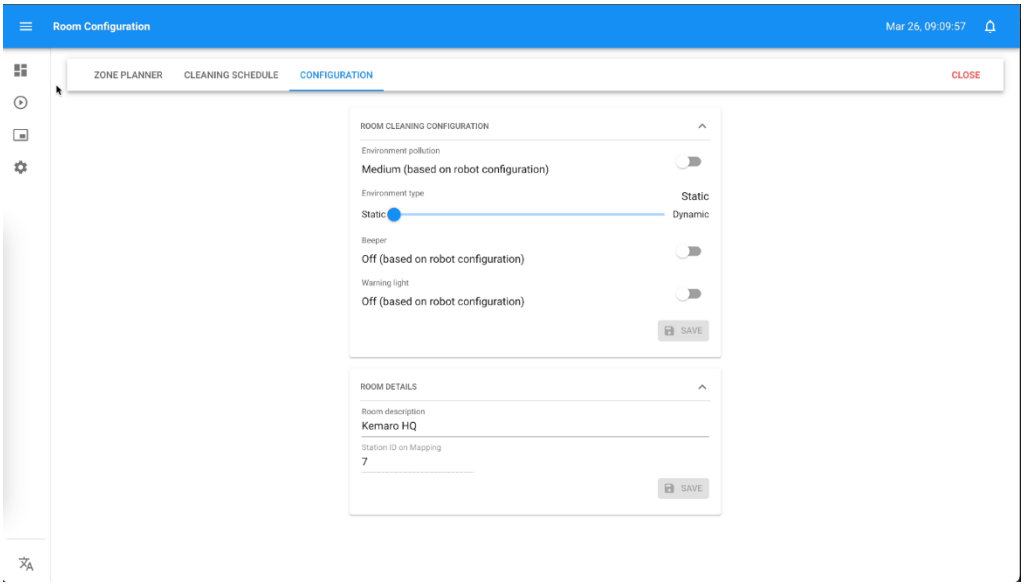


Figure 11: Adjusting cleaning configuration on room level.

- Zone planner cleaning settings

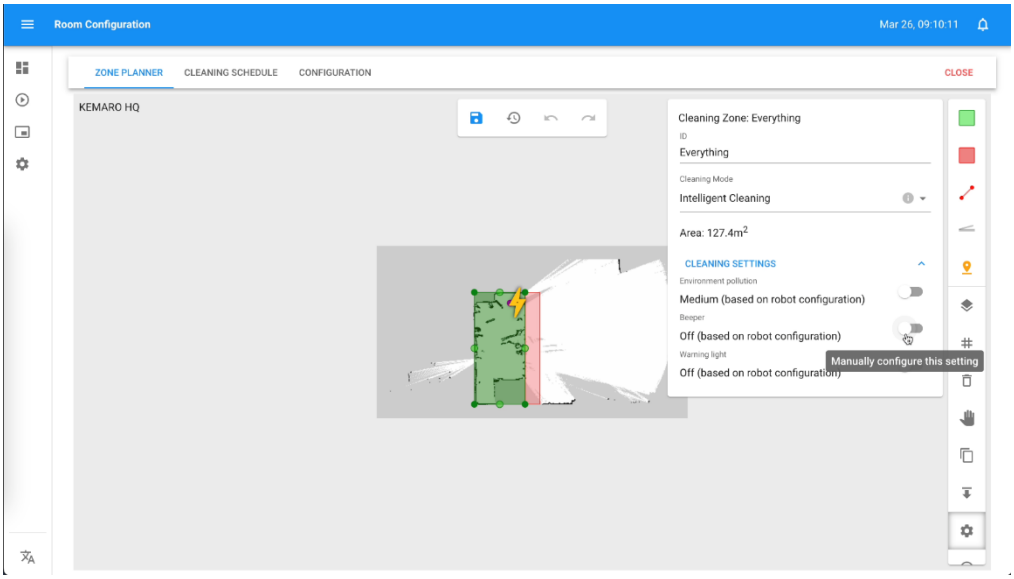


Figure 12: Adjusting cleaning configuration (e.g. beeper) on zone level.

Backup / Restore

It is possible to back up the robot's data to the servers. As well as restoring robot configuration with data saved on the server.

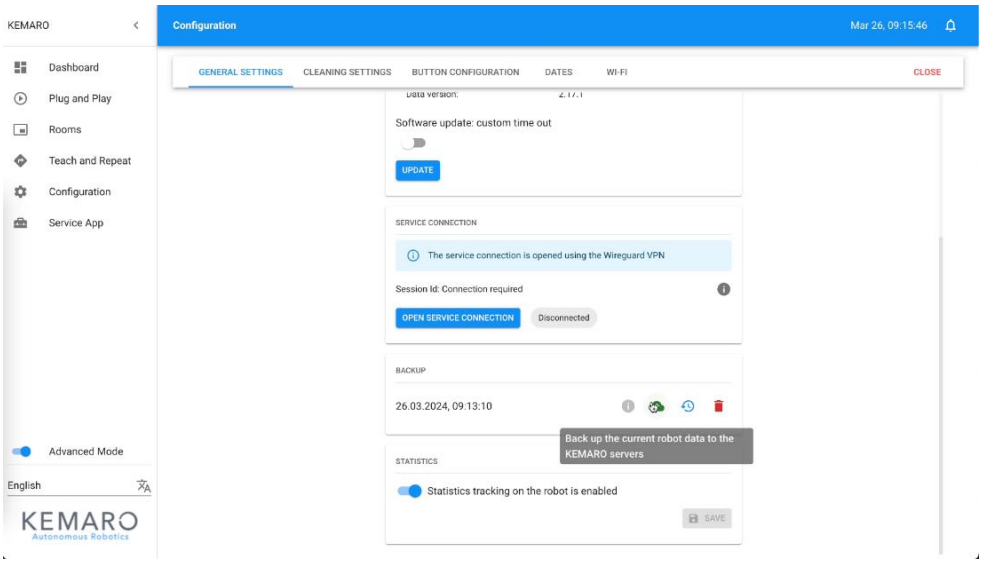


Figure 13: Current robot data can be backed up by clicking on the green cloud icon inside general settings (advanced mode).

Basic API commands

In this software version, the following basic API commands have been introduced:

- Emergency evacuation command: To move the robot onto the closest evacuation point.
- Emergency red zones: Red zones which are only loaded once in emergency mode

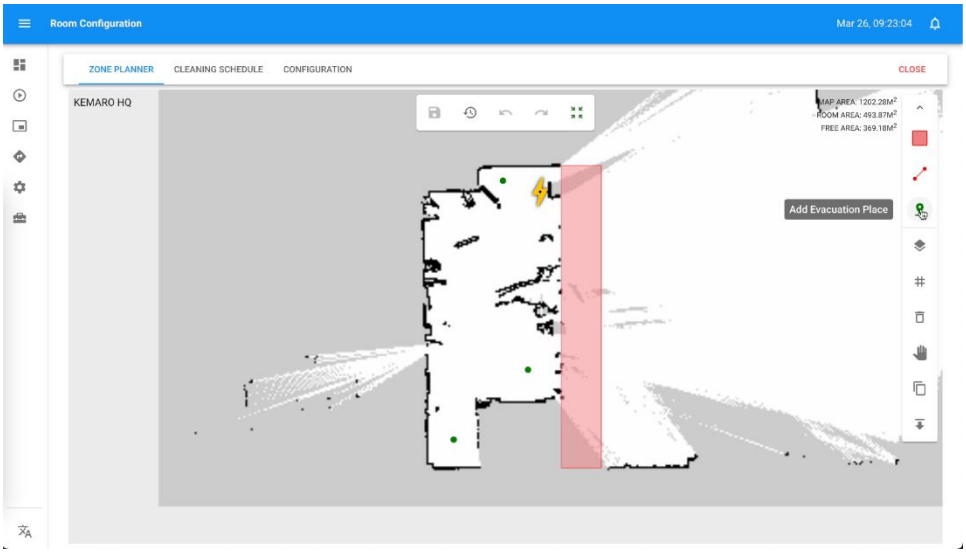


Figure 14: The tool panel on the right of the web-app now includes “Evacuation Place” feature. Emergency evacuation points or zones can only be added in the evacuation planner mode.

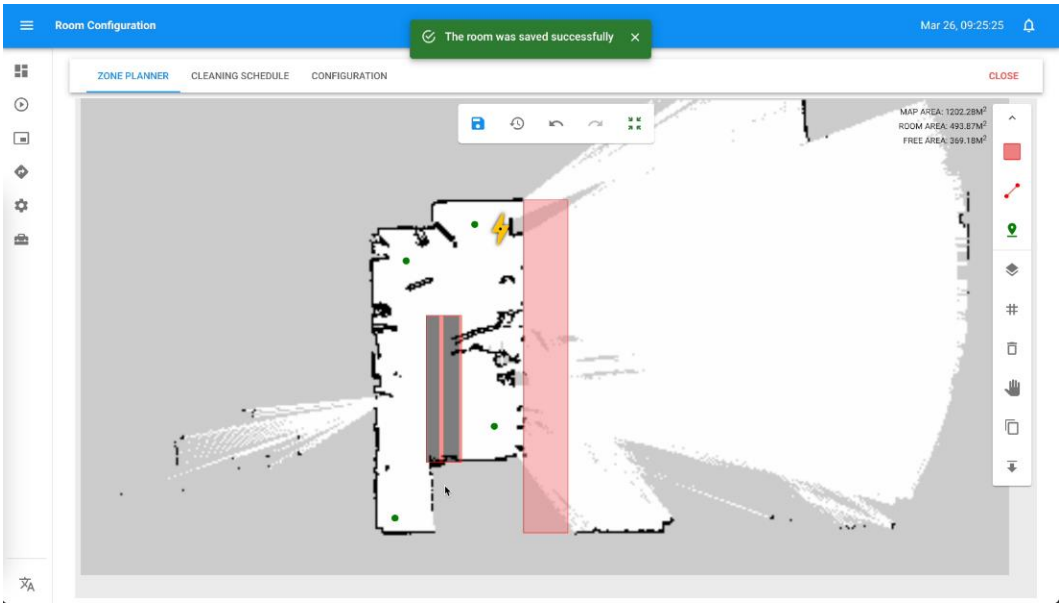


Figure 15: The tool panel on the right of the web-app now includes “Emergency Red Zones” feature in the evacuation planner mode.

In the next release, we will introduce a new *Open-door* feature. The aim is that the robot can open automated doors such that its cleaning region is enlarged. This might be in combination with a warehouse guidance system.

Old Webserver

The current web-app has completely replaced our old webserver.

Robust update (version 2023.02 or later)

The old software will still be available for use in case the new software download fails during the update.

New service connection

A new service connection via VPN is introduced in this software version. To use this new connection, a new client tool has to be used, which will be introduced soon. The new connection will provide advantages in usability, stability, and availability.

In this SW Version, both (old and new) connections can be used as follow:

- Activate service connection with MMI (STOP & HOME) opens **old and new** service connections
- Activate service connection with WebApp now opens **only the new** connection
- The maintenance LED sign is only shown the connectivity state of the old connection
- The new connection and its connectivity state is shown only in the WebApp

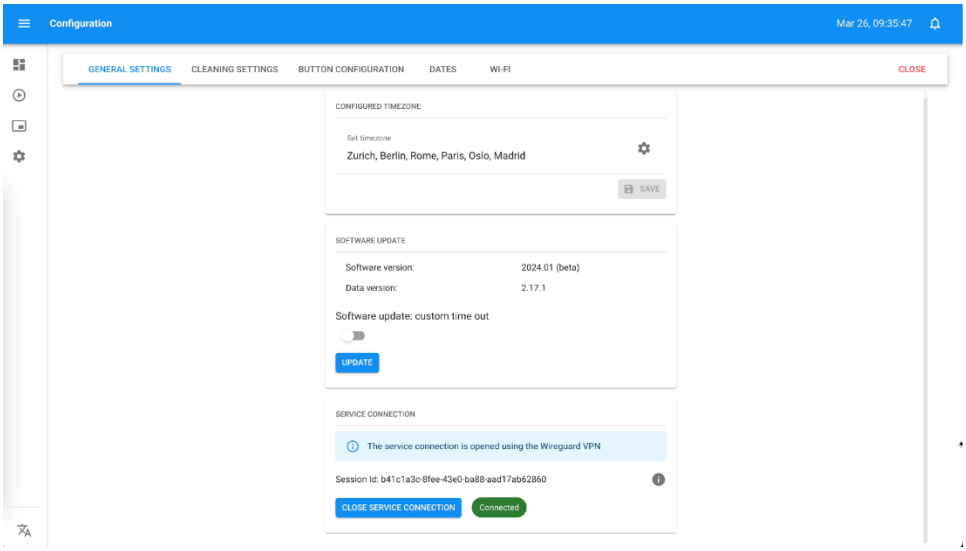


Figure 16: A VPN is being used under the service connection section of the general settings.

Service App

The service app is not available during autonomous navigation.

New error states

Two more error states are introduced in this SW version:

- Cell imbalance error

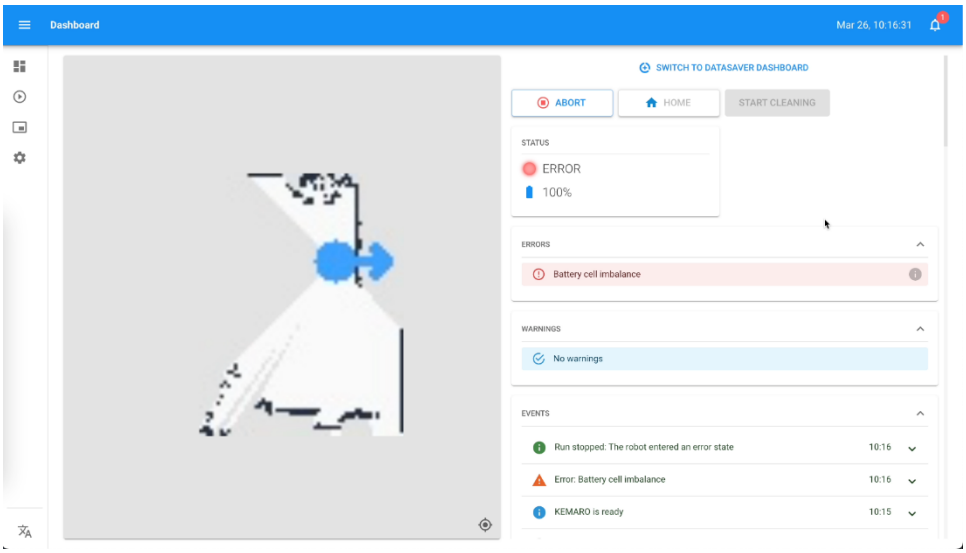


Figure 17: When a battery cell imbalance error appears, the robot will drive backwards to disconnect itself from the charging station and will then continue to shut down. The next time the robot is powered on, it will display the error, and after a brief moment it will power itself down again. Please reach out to Kemaro support to replace the battery and restore the robot back to normal operation.

- IMU error

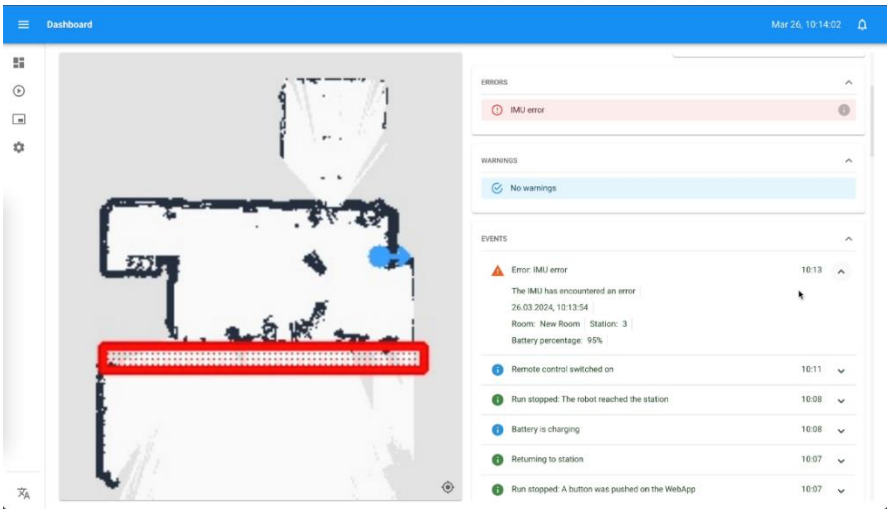


Figure 18: IMU error state points out an error within the inertial measurement unit. If an IMU error repeatedly appears, please contact technical support in case the sensor needs to be replaced.

Cloud

Now it is possible to merge several single runs into one report. The purpose is to reduce the number of reports. E.g. to have only one report per day (or per night). Another advantage is that new information on the map (like new obstacles or free space) will be kept over the defined time.

- The user is free to define which missions should be merged in the schedule on the WebApp.
- The charging time and run are now displayed during an active mission.
- If an error appears, the mission will be reported immediately.

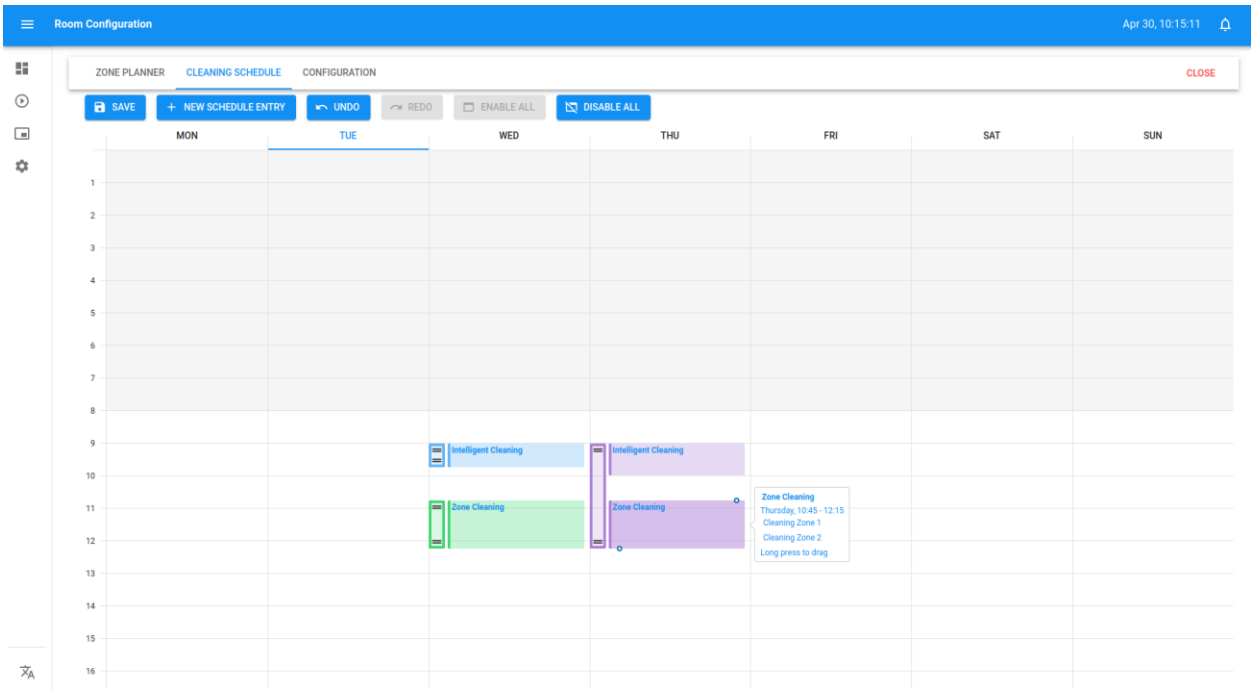


Figure 19: This WebApp cleaning schedule has three planned missions (blue, green, purple).

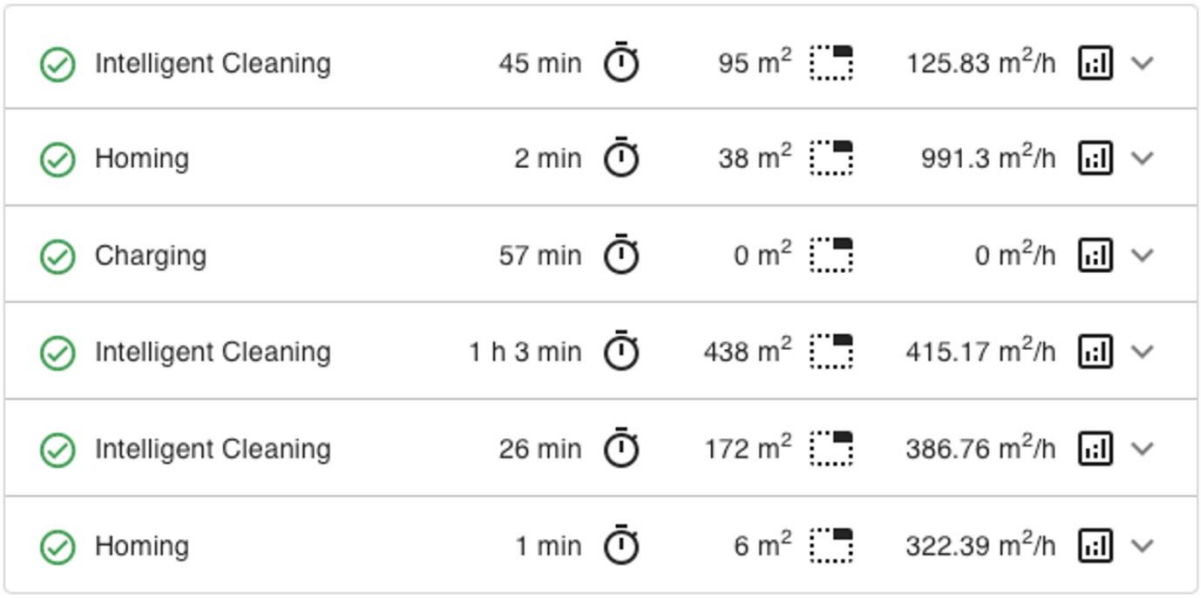


Figure 20: The cloud run report for Thursday shows the schedule of the previously mentioned figure.